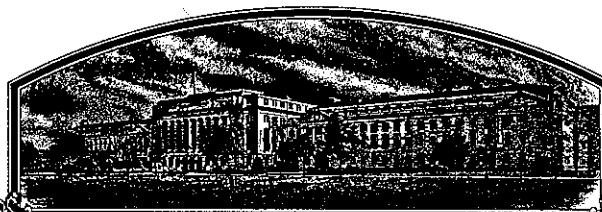


No.

8800102



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Plant Genetics, Inc.

**Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY, AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (T. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'Vector'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 30th day of June in the year of our Lord one thousand nine hundred and eighty-eight.

Attest.

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

1. NAME OF APPLICANT(S) Plant Genetics, Inc.		2. TEMPORARY DESIGNATION 83832		3. VARIETY NAME Vector	
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) 1930 5th St. Davis, CA. 95616		5. PHONE (Include area code) (916) 753-1400		FOR OFFICIAL USE ONLY PVPO NUMBER 8800102	
6. GENUS AND SPECIES NAME Medicago sativa		7. FAMILY NAME (Botanical) Leguminosae		FILING DATE March 8, 1988 TIME 10:00 <input checked="" type="checkbox"/> A.M. <input type="checkbox"/> P.M.	
8. KIND NAME Alfalfa		9. DATE OF DETERMINATION Foundation, Fall '85		FEES RECEIVED AMOUNT FOR FILING \$ 1800.00 DATE March 8, 1988 AMOUNT FOR CERTIFICATE \$ 200.00 DATE April 25, 1988	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation				12. DATE OF INCORPORATION January 1981	
11. IF INCORPORATED, GIVE STATE OF INCORPORATION California					
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Mr. James C. Weseman Limbach, Limbach & Sutton 2001 Ferry Building San Francisco, CA 94111 PHONE (Include area code): (415) 433-4150					
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.) b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement. c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.) d. <input type="checkbox"/> Exhibit D, Additional Description of Variety. e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership.					
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) <input type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input checked="" type="checkbox"/> No					
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> Yes <input type="checkbox"/> No			17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> Foundation <input type="checkbox"/> Registered <input type="checkbox"/> Certified		
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No					
19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? U.S.A. - March 26, 1987 <input checked="" type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input type="checkbox"/> No					
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF APPLICANT Keith A. Walker, Vice President, Research				DATE March 4, 1988	
SIGNATURE OF APPLICANT				DATE	

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Exhibit 14A:

Vector is a 102 plant synthetic moderate dormant alfalfa cultivar. Parent plants were mass selected for resistance to anthracnose and Phytophthora root rot. Parentage traces to Trumpetor 37%, Apollo II 33%, WL 314 13%, Vernema 11%, Maris Phoenix 4%, and Maris Sabilt 2%. Breeder seed (syn 1) was produced in 1983 near Woodland, CA. in a screened isolation cage.

Vector is stable and uniform through the foundation generation, commensurate with other alfalfa cultivars based on 14 years of data collection and observations. The certified seed generation has revealed no variants from the previous generations.

Exhibit 14B:

Vector is most similar to Apollo II and Eagle, but differs in the following pest resistances:

<u>Characteristics</u>	<u>Vector</u>	<u>Apollo II</u> ^(a)	<u>Eagle</u> ^(a)
Bacterial Wilt	R	R	HR
Verticillium Wilt	MR	MR	MR
Fusarium Wilt	HR	R	R
Anthracnose	R	MR	R
Phytophthora Root Rot	R	HR	MR
Spotted Alfalfa Aphid	R	MR	R
Pea Aphid	R	-	R
Blue Alfalfa Aphid	LR	-	LR
Stem Nematode	R	MR	R

(a) 1987 Alfalfa Varieties - published by the Certified Alfalfa Seed Council.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Alfalfa)

OBJECTIVE DESCRIPTION OF VARIETY
ALFALFA (*Medicago sativa* sensu Gunn et al.)

NAME OF APPLICANT(S) Plant Genetics, Inc.	TEMPORARY DESIGNATION 83B32	VARIETY NAME Vector
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) 1930 5th St. Davis, CA. 95616		FOR OFFICIAL USE ONLY PVPO NUMBER 8800102

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place numbers in the boxes to designate the expressions which are characteristic of the commercial generations of the application variety. Data for quantitative plant characters should be based on a minimum of 100 plants. Include leading zeros when necessary (e.g.,) for quantitative data. Comparative data should be determined from varieties entered in the same trial. Plant color may be precisely designated by using any recognized color chart, e.g., The Munsell Plant Tissue Color Charts.

1. WINTERHARDINESS:

- CLASS:
- | | |
|--|--------------------------------------|
| 1 = Very Non-Winterhardy (CUF 101) | 2 = Non-Winterhardy (Moapa 69) |
| 3 = Intermediately Non-Winterhardy (Mesilla) | 4 = Semi-Winterhardy (Lahontan) |
| 5 = (Du Puits) | 6 = Moderately Winterhardy (Saranac) |
| 7 = (Ranger) | 8 = Winterhardy (Vernal) |
| 9 = Extremely Winterhardy (Norseman) | |

TEST LOCATION: Nampa, ID; Rocksprings, PA.

2. FALL DORMANCY:

FALL DORMANCY (DETERMINED FROM SPACED PLANTINGS)

TESTING INSTITUTION AND LOCATION	DATE OF LAST CUT	DATE REGROWTH SCORED	REGROWTH SCORE OR AVERAGE HEIGHT				LSD .05
			APPLICATION VARIETY	CHECK VARIETIES*			
				Saranac AR	Vernal	Lahontan	
Plant Genetics, Inc. Nampa, ID.	9/4/84	9/19/84	4.3	4.3	3.0	6.8	1.4
Univ. of Pennsylvania Rocksprings, PA.	9/6/85	9/25/85	9.8	9.4	-	-	1.9

* CUF 101, Moapa 69, Mesilla, Lahontan, Du Puits, Saranac, Ranger, Vernal, or Norseman as appropriate.

Specify scoring system used: Regrowth in inches.

Fall Growth Habit (Determined from Fall Dormancy Trials)

- | | | |
|----------------------------|--------------------------|----------------------------|
| 1 = Erect (CUF 101) | 3 = Semierect (Mesilla) | 5 = Intermediate (Saranac) |
| 7 = Semidecumbent (Vernal) | 9 = Decumbent (Norseman) | |

3. RECOVERY AFTER FIRST SPRING CUT (In Southwest, first cut after March 21):

-
- | | | | |
|--------------------------|--------------------|---------------------------|-------------------|
| 1 = Very Fast (CUF 101) | 3 = Fast (Saranac) | 5 = Intermediate (Ranger) | 7 = Slow (Vernal) |
| 9 = Very Slow (Norseman) | | | |

TEST LOCATION: NO DATA

4. AREAS OF ADAPTATION IN U.S. (Where tested and proven adapted):

- Primary Area of Adaptation Other Areas of Adaptation

- | | | |
|--|-------------------------------|---------------|
| 1 = North Central | 2 = East Central | 3 = Southeast |
| 5 = Moderately Winterhardy Intermountain | 6 = Winterhardy Intermountain | |
| 8 = Other (Specify) | | |

- 4 = Southwest
7 = Great Plains



5. FLOWERING DATE (When 10% of plants possess open flowers at time of first spring cut):

- | | | | | | | | |
|----------------------|-------------------|----------------------|-------------|-------------|-------------|------------|--------------|
| <input type="text"/> | Days Earlier Than | <input type="text"/> | | | | | |
| | Same As | <input type="text"/> | 1 = CUF 101 | 2 = Mesilla | 3 = Saranac | 4 = Vernal | 5 = Norseman |
| <input type="text"/> | Days Later Than | <input type="text"/> | | | | | |

TEST LOCATION: NO DATA

6. PLANT COLOR (Determined from healthy regrowth 3 weeks after first spring out, controlling leafhoppers if necessary):

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☐

1 = Very Dark Green (524)

2 = Dark Green (Vernal)

3 = Light Green (Ranger)

COLOR CHART VALUE (Specify chart used; With varieties listed above, there is no comparison.)

APPLICATION VARIETY: _____

VERNAL: _____

TEST LOCATION: _____

7. CROWN TYPE (Determined from spaced plantings):

☐

Noncreeping Types:

1 = Broad (Vernal)

2 = Intermediate (Saranac)

3 = Narrow (CUF 101)

Creeping Types:

4 = Creeping Rooted (Rangelander)

5 = Rhizomatous (Rhizoma)

8. FLOWER COLOR (Determine frequency of plants for each color class as defined by USDA Agricultural Handbook No. 424 (Barnes 1972), allowing all plants in plot to flower):

☐

% Purple and Violet (Subclasses 1.1 to 1.4)

☐

% Blue (Subclasses 2.3 and 2.4)

☐

% Variegated Other Than Blue (Subclasses 2.1, 2.2, 2.5 to 2.9)

☐

% Yellow (Subclasses 4.1 to 4.4)

☐

% Cream (Class 3)

☐

% White (Class 5)

TEST LOCATION: Canyon County, Idaho

9. POD SHAPE (Determine frequency of plants with the following pod shapes produced on well cross-pollinated racemes):

☐

% Tightly Coiled (One or more coils, center more or less closed)

☐

% Loosely Coiled (One or more coils, center conspicuously open)

☐

% Sickle (Less than 1 coil)

TEST LOCATION: Canyon County, Idaho

10. PEST RESISTANCE: Provide in the appropriate column, trial data for application variety, and resistant (R) and susceptible (S) check varieties, synthetic generation tested, average severity index scores (ASI), least significant difference statistics (LSD .05), the institution in charge of test, year, and location of test, and whether test is a field or laboratory evaluation. Describe scoring system, and any test procedure which differs from standard methods proposed by Elgin (1982). Trial data from other test years or locations should be presented whenever available on a separate document as Exhibit D.

Seeds of the check varieties and germplasm lines listed below can be obtained from the USDA Field Crops Laboratory, Bldg. 001, Rm. 335, BARC-West, Beltsville, MD 20705. Although comparisons with check varieties listed below are preferred, comparisons with any appropriate check variety recommended by Elgin (1982) may be presented.

A. DISEASE RESISTANCE:	DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Anthraxnose, Race 1 (<i>Colletotrichum trifolii</i>)	Application	1	41.2	134	NA	5.8	Plant Genetics, Inc. 1984 Woodland, CA. Greenhouse	
	Arc (R) Saranac AR (HR)	69.2	1095					
	Saranac (S)	1.7	1236					
	SCORING SYSTEM: % seedling survival.							
Anthraxnose, Race 2 (<i>Collectotrichum trifolii</i>)	Application							
	Saranac AR (R)							
	Arc (S)							
	SCORING SYSTEM:							
Bacterial Wilt (<i>Corynebacterium insidiosum</i>)	Application	1	49.3	Assumed 150-225	2.01	0.39	University of Minn. 1985 Rosemount, MN. Field	
	Vernal (R)	42.0	Assumed 150-225	2.28				
	Narragansett (S)	5.2	Assumed 150-225	3.69				
	SCORING SYSTEM: 0-5; % 0's & 1's = % resistance.							
Common Leafspot (<i>Pseudopeziza medicaginis</i>)	Application							
	MSA-CW3AN3 (R)							
	Ranger (S)							
	SCORING SYSTEM:							

DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Downy Mildew (<i>Peronospora trifoliorum</i>) Isolate, if known: NO DATA	Application						
	Saranac (R)						
	Kanza (S)						
	SCORING SYSTEM:						
Fusarium Wilt (<i>Fusarium oxysporum</i> f. <i>medicaginis</i>)	Application	2	57.4	Assumed 120-180	2.14	0.77	University of Minn. 1987 Rosemount, MN Field
	Moapa 69 (R)		81.3	Assumed 120-180	1.47		
	Altagensett (R) Mn Gn-1 (s)		0.9	Assumed 120-180	4.90		
	SCORING SYSTEM: 0-5; % 0's & 1's = % resistance						
Phytophthora Root Rot (<i>Phytophthora megasperma</i> f. <i>medicaginis</i>)	Application	2	47.3	113	2.52	0.23	Plant Genetics, Inc. 1986 Woodland, CA. Greenhouse
	Agate (R)		45.7	114	2.59		
	Saranac (S)		5.9	490	3.27		
	SCORING SYSTEM: 1-5; % 1's & 2's = % resistance.						
Verticillium Wilt (<i>Verticillium albo-atrum</i>)	Application	1	23.0	214	3.11	0.24	Plant Genetics, Inc. 1984 Nampa, ID. Greenhouse
	Vertus (R)		34.1	120	2.82		
	Saranac (S)		0.0	102	4.27		
	SCORING SYSTEM: 1-5; % 1's & 2's = % resistance.						
Other (Specify)	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						
Other (Specify)	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						
B. INSECT RESISTANCE:	VARIETY	SYN. GEN. TESTED	PERCENT DEFOLIATION	DEFOLIATION IN PERCENT OF RESISTANT CHECK	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
	Alfalfa Weevil (<i>Hypera postica</i>)						
	Application						
	Arc (R)			100			
NO DATA	Saranac (S)						
	SCORING SYSTEM:						

10. B. INSECT RESISTANCE (Continued):

INSECT	VARIETY	SYN. GEN. TESTED	PERCENT SEEDLING SURVIVAL	NUMBER OF SEEDLINGS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY	
Blue Alfalfa Aphid (<i>Acyrtosiphon kondoi</i>)	Application	1	13.6	191	NA	4.1	Plant Genetics, Inc. 1984 Woodland, CA. Greenhouse	
	CUF 101 (R)		48.6	193				
	RA-1 (S) Mesa Sirsa (s)		0.1	2139				
	SCORING SYSTEM: % seedling survival							
Pea Aphid (<i>Acyrtosiphon pisum</i>)	Application	1	31.6	137	NA	10.8	Plant Genetics, Inc. 1984 Woodland, CA. Greenhouse	
	Kanza (R)		44.5	139				
	Banger (S) Moapa 69 (s)		0.7	841				
	SCORING SYSTEM: % seedling survival.							
Spotted Alfalfa Aphid (<i>Therioaphis maculata</i>) Biotype, if known:	Application	2	32.8	167	NA	10.1	Plant Genetics, Inc. 1986 Woodland, CA. Greenhouse	
	Kanza (R) Baker (R)		72.0	184				
	Ranger (S) Caliverde (S)		0.5	1868				
	SCORING SYSTEM:							
INSECT	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY	
Potato Leafhopper Yellowing (<i>Empoasca fabae</i>) NO DATA	Application							
	MSA-CW3An3 (R)							
	Ranger (S)							
	SCORING SYSTEM:							
Other (Specify)	Application							
	(R)							
	(S)							
	SCORING SYSTEM:							
C. NEMATODE RESISTANCE:								
NEMATODE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY	
Northern Root Knot (<i>Meloidogyne hapla</i>) NO DATA	Application							
	Nev. Syn. XX (R)							
	Lahontan (S)							
	SCORING SYSTEM:							

10. C. NEMATODE RESISTANCE (Continued):

10. C. NEMATODE RESISTANCE (Continued)							
NEMATODE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Southern Root Knot (<i>Meloidogyne incognita</i>) NO DATA	Application						
	Moapa 69 (R)						
	Lahontan (S)						
	SCORING SYSTEM:						
Stem Nematode (<i>Ditylenchus dipsaci</i>)	Application	2	32.6	107	3.33	0.27	Plant Genetics, Inc. 1986 Woodland, CA. Greenhouse
	Lahontan (R)		55.0	95	2.78		
	Ranger (S)		4.2	273	3.86		
	SCORING SYSTEM: 1-5; % 1's & 2's = % resistance.						
Other (Specify)	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

11. INDICATE THE VARIETY THAT MOST CLOSELY RESEMBLES THE APPLICATION VARIETY FOR EACH OF THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
Winterhardiness	Saranac AR	Plant Color	No Critical Data
Recovery After 1st Cut	Saranac AR	Crown Type	No Critical Data
Area of Adaptation	Saranac AR	Combined Disease Resistance	Apollo II
Flowering Date	No Critical Data	Combined Insect Resistance	Eagle

REFERENCES

- Barnes, D.K. 1972. A System for Visually Classifying Alfalfa Flower Color. U.S. Dep. Agric. Handb. 424. 18 pp. (Note: Greenish cast of plate 6, A and B is an artifact of printing, actual colors a blend of yellow and white.)
- Elgin, J.H., Jr., (ed.). 1982. Standard Tests to Characterize Pest Resistance in Alfalfa Cultivars. U.S. Dep. Agric. Tech. Bull. (In Press).
- Gunn, C.R., W.H. Skrdla, and H.C. Spencer. 1978. Classification of *Medicago sativa* L. using legume characters and flower colors. U.S. Dep. Agric. Tech. Bull. 1574. 84 pp.
- Munsell Color Co. 1977. Munsell Plant Tissue Color Charts. Munsell Color Co., Inc. Baltimore.

NOTE: Any additional descriptive information and supporting documentation may be provided as Exhibit D.

Exhibit 14E:

The principal breeder, Ike Kawaguchi, was employed by Plant Genetics, Inc. All rights to alfalfa varieties developed by the breeder while employed by Plant Genetics, Inc. are assigned to Plant Genetics, Inc.